Bell Telephone MAGAZINE

AUTUMN 1957

"What Communications Will Jet Liners Need?"

VOLUME XXXVI NUMBER THREE AUTUMN 1957

Bell Telephone Magazine

A non-technical review, published quarterly to give Bell System management people a broader view of the history, objectives, operations, and achievements of this business than they might attain in the course of their day-to-day occupations, and an added sense of participation in the problems and accomplishments of our nation-wide public service.

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Painted for this Magazine by *Donald E. Smolen*

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A MEDIUM OF SUGGESTION and A RECORD OF PROGRESS

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Who's Who & What's What In This Issue

FREDERICK R. KAPPEL was elected president of the American Telephone and Telegraph Company on September 19, 1956. He had been president of the Western Electric Company, the manufacturing unit of the Bell System, since January 1, 1954. Mr. Kappel started in the plant department of the Northwestern Bell Telephone Company in 1924. In the next few years he held many assignments in the plant, engineering, and commercial departments—all in Minneapolis. Ten years after he had joined the Bell System, he went to Omaha as plant engineer of the Nebraska-South Dakota Area, and three years later he was plant operations supervisor on the staff of Northwestern Bell at Omaha. In 1939 he became assistant vice president of operations, and after three years he was elected vice president of operations and a director of the Northwestern Bell Telephone Company. He came to A. T. & T. in January, 1949, as assistant vice president in the Department of Operation and Engineering. In February of that year Mr. Kappel was elected vice president of the Long Lines Department. In November, 1949, he returned to the General Departments as vice president in charge of Operation

Frederick R. Kappel

Robert E. Conrath

Ralph Bown

and Engineering. He remained in this post until he became president of Western Electric.

A MEMBER of the Long Lines Department since 1930, ROBERT E. CONRATH had gained experience in both the Plant and Commercial Departments, and had become a staff supervisor in the latter, when he went to war in 1941. A colonel in the Signal Corps, he served in France, the Rhineland, and Central Europe. He returned to Long Lines in New York in 1946, and transferred to the Chicago Division office in 1948 as division sales supervisor. Two years later he became division commercial supervisor there. In 1951 he moved to Kansas City as commercial staff supervisor, and in 1953 he was made commercial service supervisor. He writes with authority about the growing and changing needs of the country's air lines, since he is chairman of the Bell System air line survey group which conducted the Industry Study in that field.

RALPH BOWN retired in February of 1956 as vice president of Bell Telephone Laboratories. Joining the Department of Development and Research of the American Telephone and Telegraph Company in 1919, Mr. Bown was transferred in 1934 to Bell Laboratories in charge of radio research. This post was expanded to director of radio and television research in 1936. In 1944 he was appointed assistant director of research, became director in 1946, and was made vice president in charge of research in 1951. From 1954 until his retirement he was vice president in charge of long range planning of Laboratories programs. Much of Dr. Bown's work was concerned with various aspects of radio broadcasting, overseas telephony, and radio relay. He was a division member and consultant of the National Defense Research Committee specializing in radar, and an expert consultant to the Secretary of War; and in 1941 he visited England to study radar operations under combat conditions. Since retirement he has been serving as chairman of the Sci-

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Alexander L. Stott

H.M.T.S. Monarch approaches Hawaiian shores with submarine telephone cable. See page 42

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A talk at the annual convention of the United States Independent Telephone Association in Chicago, Illinois, on October 14, 1957

COMMON GOALS FOR CHANGING TIMES

FREDERICK R. KAPPEL

President, AMERICAN TELEPHONE AND TELEGRAPH COMPANY

IT IS A GREAT HONOR to be here and I appreciate it very much. However, I'd say it was something much more important than an honor. This industry of ours has work to do and goals to reach that are extremely important to the nation. It is up to us to provide the very best in communication service, and to equip ourselves physically and financially, as well as with all the human skills we need, to accomplish the most we can in the public interest. And I think that in inviting me here today, you are saying in effect that to do these things, we in the telephone industry must get together, think together, and plan and work together. In fact I'm sure that is why you asked me. You can be just as sure it is why I came.

I congratulate the U.S.I.T.A. and all its members on 60 years of progress. You have played a vital part in the total accomplishment of the industry and you are certainly doing so today. No one could say this more sincerely than I do.

The way things are going nowadays, however, none of us has much time to be looking back. The future isn't waiting for us. It's rushing right at us. This country is growing faster than anyone could have believed a few years ago. Along with the growth, people are moving around and changing their ways of living and also their ways of working. And all this moving and changing tends to make communications continuously more important to more people.

That's half the story. The other half is that we who provide communication service have more and more to offer. We're getting an assortment of tools to work with that are almost beyond belief. New instruments, new switching, new transmission systems—these are producing all kinds of new possibilities in service.

Today and tomorrow our industry can provide ever-increasing convenience in communications. More and more we can tailor-make our voice services to meet in-

H.M.T.S. Monarch approaches Hawaiian shores with submarine telephone cable. See page 12

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dividual needs and tastes. In addition, teletypewriter service can do a growing variety of jobs. We're putting in circuits and developing equipment to handle great volumes of high-speed data communications. We also have the prospect of providing picture channels for many purposes, in addition to networks for television broadcasting.

In short, I'd say the future offers opportunity unlimited. But in the same breath I'd also say we have new responsibilities to match.

WHAT does it mean, for instance, that the telephone companies of the nation can offer their customers a broader range of services and a wide choice of instruments?

For the folks we are serving, naturally it means they are more free than ever before to look the situation over and pick out what suits their particular needs and tastes.

This is fine and as it should be. But let's not forget that giving the customer this range of choice means first of all that we have more decisions to make ourselves. It means, too, that we assume greater risks. The first important fact about every new service and every improvement of service is that it calls for good sound management judgment on our part.

If we're going to answer more needs, first we shall have to answer more questions—questions like these:

How broad is the market? How fast shall we build for it? How much investment will be needed? How do we best promote and sell the service? And over and over again—as we grow, and as our risks increase, how do we make sure that we grow at a profit?

So my first thought is simply this:

We have a tremendous future in this telephone industry, but it isn't going to be realized on technology alone. Transistors and computers and wave guides and all these things the scientists discover are wonderful. We couldn't do without them. However, they are not Aladdin's lamps. We can't just rub a transistor and make a wish and expect it to come true. The fact is that to take advantage of our new communication tools, to realize all the wonderful opportunities they open up, requires us as managers to do a better job of managing than we have ever done before.

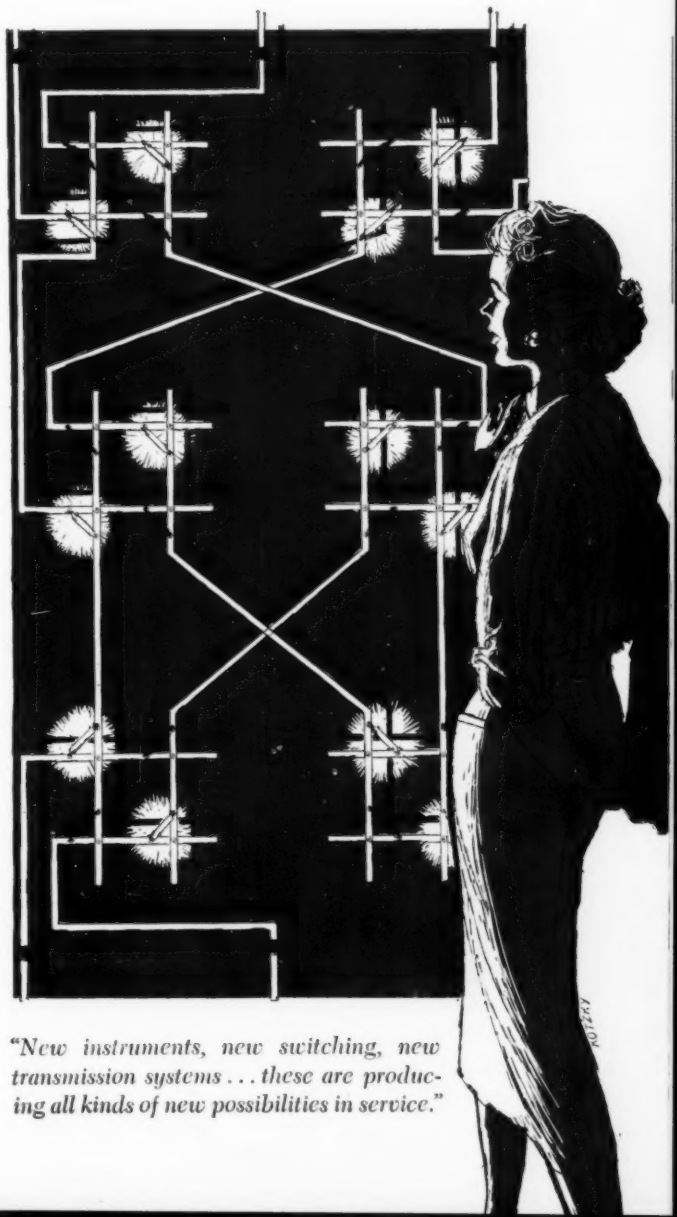
I'm sure too that the great changes which are taking place, both outside and inside the industry, will closely affect every one of us. Nobody is immune to progress. This may be disconcerting at times, but we had better accept it. Nowadays jet planes don't wind their vapor trails through any particular part of the sky. The man with the oil drill may turn up almost anywhere, and the woods are full of highway surveyors. I don't mean that every hamlet is going to be a suburb, or every pasture a factory branch. But there aren't very many places that come with a no-change guarantee. In the world we live in today, 'most anything can happen, any time, anywhere.

And this it seems to me is crystal clear: we in the telephone business must meet these changes together, for ours is one single industry and our service is indivisible. Far more than in other types of business, the progress we make depends on how effectively we combine our efforts.

I THINK THIS has been growing on all of us year by year. At any rate, it has been growing on me and I certainly hope it has on you. The basic reason is plain and

simple: none of us can serve the community and the country well without the help of the others. None of us in the long run can prosper, unless jointly and together we accomplish a fine service job. All of us need each other's coöperation in order to succeed.

As time goes along, this situation tends to become more pronounced rather than less. Distance dialing is one of the factors, but only one. In more and more places we live and work in each other's laps. We mesh closer and closer together. When big customers want special services, we must jointly provide them. We share rate problems and directory problems as well



"New instruments, new switching, new transmission systems . . . these are producing all kinds of new possibilities in service."

". . . we in the telephone business must meet these changes together, for ours is one single industry and our service is indivisible."

as service operating problems.

Now I'm not going into a lot of de on this subject. You know the details a way. The big thing is that we're all wo ing on the same job, and to do it well must coöperate. And I think we are think we're working together better th we ever have before, and I don't see a reason why that shouldn't continue.

Of course most of us are all in fa of coöperation when it means having t other fellow do things our way. We like that. But in real life we usually ha to settle for something less. It's a matt of give and take. No one can coöpera with a stiff neck. We have to bend a litt On the other hand, being anxious to coö erate doesn't mean that anybody ought t give the other fellow his shirt, either. guess no one in this business expects an thing along that line. But we can alway meet with good will and in good spirit and work out common problems on

sound business basis. I have full confidence that we shall continue to do exactly that.

Anyway, that's what we're going to have to do, because this country needs a big, growing, unified, common-carrier telephone system – one that will always be ready for any job. It must be strong in its people, strong in technology, and strong financially. And all these assets, as I've said, we must employ throughout the industry so that we meet – together – this fascinating challenge of providing more service and improved service and entirely new services as our customers want them; doing this in a way that mixes all the skills of marketing, financing, engineering, and operating – so that we go as fast as we should but not faster, and give the public the most we can while at the same time we earn enough to make still more progress possible.

WITH THAT SORT of goal in mind, I'd like to say a little now about a few specific problems of our industry—problems that are important to us all.

One of them is this matter of competition. It seems there are quite a few non-communication companies today that would like to provide a considerable part of their communications themselves, without depending on the common carriers. In particular they want to build private microwave radio systems and are asking the F.C.C. for permission to do so.

Of course this goes against the basic principles and experience, which have shown that the public interest depends on common-carrier service. Indiscriminate licensing of non-common carriers to build their own systems would not only sacrifice the most efficient use of the radio spectrum; it could very seriously interfere with the ability of the telephone companies to serve the public at reasonable prices. Thus any possible advantage to non-common-carrier licensees would only be obtained at the expense of the general public. I realize that right-of-way companies and public safety organizations may have some need for private systems, but these are special cases.

Our industry position is clear and sound. Both your people and ours have stated it, but we all need to keep on talking it to be certain that others know and fully understand it. We are sure common-carrier service results in lower costs to the public. We are confident it also makes possible much more efficient use of the radio spectrum. We know a strong common-carrier network is a much greater asset in time of emergency or war than a fragmentized hodge-podge of private systems could ever be.

Today I only want to add this comment:

In the long run the public will approve a decision in our favor, not on the basis of hearing-room testimony, but on the basis of how well we in the telephone companies jointly succeed in providing the services our customers want.

HERE IS another matter that seems to me to concern the whole industry:

What do the people who are working in this business really know and believe about the outfits they are working for?

That depends mostly on how diligent the companies are to give employees the facts, and on how well we succeed in demonstrating our sincerity.

I'm sure we *must* succeed in this, for if most of the things employees know or think they know should come from some of the union papers and union press re-

leases I see, they will certainly get some strange ideas.

For instance, I saw a union editorial the other day that had the Bell System waxing rich and practically choking on fat profits. This kind of thing is so absurd, you may wonder why I even mention it. The reason is that the problems which unions and managements are concerned with are so important, not only to them but to the public and the nation as a whole, that there just isn't any room for careless or misleading talk.

You and I know that the telephone companies are bound to provide wages and working conditions that compare favorably with other industry and offer attractive opportunity for willing and industrious men and women. We can't make progress in any other way. I'm simply saying here that the need to accomplish the best for all concerned—for employees, for customers, and for investors – absolutely requires a thoughtful and factual approach. Nothing else will do. Frivolous and unconsidered statements can only cause harm—the more so if by silence we seem to give them our consent. What we need is to get such a steady stream of truth flowing that there's no room in the river for anything else.

ANOTHER BIG industry-wide job is to get enough earnings. Telephone service has been a low-earning enterprise now for a long time. It ought not to be. To be sure, we've improved—at least most companies have improved—quite a bit in recent years. But most of us still have quite a way to go.

". . . the problems which unions and managements are concerned with are so important . . . there just isn't any room for careless or misleading talk."

"The fact is . . . that good earnings mean quality service at lower cost to the user."

I also think that to go that distance we need to keep hammering at a basic idea.

This is that in the long run good earnings mean better service at lower rates. A large segment of the public and too many of the commissions have quite a different idea today. They seem to think low earnings mean low rates and good earnings mean high rates. It is this climate that has made us a low-earning business in the post-war period.

Can the climate be changed? I certainly think it can. The public today has no idea that the lowest-earning soap company makes the best and cheapest soap, or the lowest-earning automobile company the best and cheapest automobiles, or the lowest-earning meat-packer the best and cheapest hams.

Why should we let the idea hang on that the low-earning telephone company gives the best and cheapest service? We know it isn't so and we also know that people don't have this idea about other

kinds of businesses. Why should they keep this false notion about us?

The fact is—and I know this is repetition—that good earnings mean quality service at lower cost to the user. And good service is much more important to our customers than the precise rate they pay.

We simply must show the commissions and the public that the only way to telephone progress is through telephone prosperity. As I said at the start, we have tremendous new opportunities to provide improvements in service and a great variety of new services. These will add to the convenience and comfort of men and women everywhere. They will help other businesses and make a very large further contribution to the progress of our national economy. But all this potential achievement depends on our earning well.

We must raise capital in huge amounts. We must continue to push research and development work. We must take new and substantial risks. We must not merely keep, we must enlarge and deepen, the respect and faith and trust of people who have money to invest—both those who have already bought our securities and those who have never done so before.

Is it asking too much of regulatory commissions to exercise in fullest measure their practical judgment, their imagination, and their political courage? I am sure it is not. And I am especially sure of this when I reflect that the problems which confront the regulator when a business is successful, and can go ahead progressively from one achievement to another, are as nothing compared with the problems which confront him when a business doesn't have the money to do what ought to be done.

Today in many states we see a glaring inconsistency. Their efforts to encourage and attract new industry are very different from the consideration they give to our industry, which is already there. Do they really expect to attract others and bring employment and prosperity up, while at the same time they regulate telephone expansion and employment down? I cannot believe it. It is our job to demonstrate that every state needs our financial good health, not only for what this means in direct telephone employment and wages, but equally or even more for what we can do to help make the state attractive to others. One of the first things any industry wants to be sure of is that it can count on full and fine service from us.

I HAVE ONLY one other specific matter to mention which seems to me of top importance.

With a tremendous service job ahead—

With lots of competition all around us—

With the need to better our earnings—

With the continuing challenge of dealing with the unions in ways that will be fair to employees, fair to the public, and fair to the share owners—

With this kind of future, it seems to me a plain necessity that we do the very best we can to help build our future telephone management.

This is a many-sided matter. It is not something for which we can find a formula. Nor is this a job that some of us can work at and others leave alone. It is the responsibility of every boss in the business.

I put it that way because the great essential is to have the kind of working atmosphere in this business that gives people air and room and freedom and incentive to grow. And it is the boss—all bosses together—who determine that atmosphere.

Throughout the industry we are doing many things to try to aid the process of growth. We are broadening engineering

"... a plain necessity that we do the very best we can to help build our future telephone management."

training. We are using conferences, case studies, discussions and courses of various kinds to broaden the knowledge and outlook of our people.

But in my judgment all these activities, valuable as they may be, can only be effective as aids to growth in the right kind of climate—and for that the boss is everlastingly responsible. We'll do the best job, I'm sure, when—and only when—every boss acts on the understanding that an indispensable part of his assignment is to do everything he thoughtfully and reasonably can to encourage the growth of his subordinates.

Perhaps you will agree that these broad industry problems I've been discussing make quite a handful. We have a real job ahead of us. But in closing, I'd like to express again my complete confidence in the forward motion of this business. The longer we go, the greater the promise of the future seems to be.

YOU IN THIS Association can now look back on 60 years of progress, and I con-

gratulate you again on that. However, you don't need to look anywhere near that far to be conscious of great achievement. What you have brought about in the last decade alone ought to make you feel pretty good. And in the years to come, you must be well aware that the very nature of this country's growth, and the kinds of changes that are in the making, give you spectacular opportunities.

Yet I'd rather end on this note:— that the job ahead is not partly for you to do and partly for us in the Bell System to do, but rather that all of the job is ours to do together. For it is the kind of service that grows out of this concept that the public will surely insist on, and we must surely deliver. I'm confident we're going to do it, and our being here together this afternoon is further evidence that you have the same idea. Thank you again for the privilege of talking to you.

New ten-year Index to the Bell Telephone Magazine catches up with the past decade

A ten-year cumulative index to the BELL TELEPHONE MAGAZINE, covering Volumes 26-35, 1947-1956, is being published this Fall, and copies will be furnished on request, without charge.

The new index, compiled in the Public Relations Department library of the A. T. & T. Co., gives a comprehensive listing and cross-indexing of the items appearing in the approximately 2,500 pages of the 40 Numbers of the MAGAZINE issued in the past decade. The scope of the publication has increased greatly in this period, and the index will be of undoubted value to those who have occasion to seek information about Bell System activities of the recent past. This index supplements the original 25-year cumulative index issued ten years ago, covering the first quarter century of the MAGAZINE—and its predecessor, the *Bell Telephone Quarterly*—which is still of use but is, of course, outdated.

People who feel that they will find this new volume useful should ask the editor of the MAGAZINE for a copy.

A Bell System airline survey group looks into the future requirements of air carriers flying 150-passenger planes at 600 miles an hour

WHAT COMMUNICATIONS WILL JET LINERS NEED?

ROBERT E. CONRATH

Commercial Service Supervisor, KANSAS CITY, LONG LINES DEPARTMENT, A. T. & T. CO.

"WILL YOU hold the line just a moment, please? . . . Yes, I can confirm your space on Alpha Airlines' Flight 34 to Chicago for tomorrow, the tenth, and from Chicago to Phoenix on Beta Airlines' Flight 56 on the eleventh."

"Flight 17 is on time; it will arrive at Gate 5 in just 10 minutes."

"Your dollar will buy a hundred thousand in air travel insurance instead of seventy-five. Air travel is so safe that the rate was lowered again just last week."

Whether the air traveler of tomorrow receives crisp, authoritative replies like these depends to an amazing extent upon the availability to the airlines of appropriate and adequate communication services.

Few businesses are as dependent as the airlines on fast, accurate local and intercity communication services for safety of operation and for service to their customers. The Bell System has been serving the airlines since they first started, and has had to hustle to keep up with their changing requirements. It is faced with a real challenge now that the long-heralded jet transport is only a couple of years away.

To insure that communication services will be ready when airliners are carrying a hundred and fifty passengers and flying six hundred miles an hour, a special Bell System airline survey group was appointed last year. Its assignment was to determine the types and quantities of communication which will be required by the airlines up to perhaps ten years in the future.

The membership of the ten-man group was System-wide. It was composed of four from the Long Lines Department, four from Associated Companies, and two part-time members from A. T. & .T.'s Department of Operation and Engineering who maintained liaison with other System units.

In the course of its study, members of the group interviewed communication and operating people of every scheduled passenger airline in the country. Industry associations and government agencies concerned with commercial aviation were consulted. Assistance was obtained from the Bell Laboratories group working on Air Traffic Control problems.

Administration, Reservations, Operations

AIRLINES use communications in connection with three general phases of their business: administration, reservations, and operations.

The administrative functions of an airline are similar to those of any business of comparable size, and the communications involved are those normal to accounting, purchasing, and personnel departments – amounting to perhaps ten percent of its total communications requirement.

What "Reservations" Includes

RESERVATIONS, in its broadest sense, pertains to the promotion of air travel, the reservation and sale of space, and the emplaning of the passenger. This accounts for about 60 per cent of all airline communication.

Communications start with the pro-

The telephone is the "heartbeat" of an airlines reservation system. This is one of the largest, most modern reservation systems in operation today

spective passenger. Most airline reservations are made by telephone—and will continue to be. At their larger offices, some airlines are now using automatic call distribution systems which direct incoming reservations calls to agents whose telephones are not in use at the moment. This is an improvement over having a PBX operator answer and then pass the call to a reservations agent. To give the kind of service you, as an airline customer, would like, the airlines need help in keeping track of the volume of incoming calls and those waiting to be answered. With up-to-the-minute information, they can adjust their force quickly to meet the demand, and "Reservations is busy; will you wait please?" will be a rarity.

Improvement in the automatic call distribution system is needed, our survey reveals. In its present design, it can be used economically only in relatively large installations. Smaller equipment "packages" are required to permit the small airline office to offer the same service advantages as the large one.

Great changes are under way in the field of recording and controlling airline seat reservations.

The reservation system almost universally used today is called "sell and record". It works like this: At a central location each line keeps an inventory of

This service area's files enable airline personnel to obtain information quickly about flights, passenger lists, special arrangements, and similar matters

Teletypewriter service meets the requirement for fast written communication of reservation information between airlines

its seat space for every flight for 30 days or more in advance. Any office of the airline can sell space on any flight and, upon doing so, reports the sale immediately to the central space control office. Seat inventories are decreased by the reported sales, and as soon as there are just a few seats left on any particular section of a flight, a "stop sale" message goes out to all offices. From this point on, sale of space on that particular flight section is on a "request and confirm" basis; that is, the sales office requests the space, by telephone or teletypewriter, from the central space control office and, if it is available, the latter confirms the reservations.

The "cushion," or point at which the transition is made from the "sell and record" system to "request and confirm" and at which the "stop sale" message is sent, is based on experience. It is to a large degree determined by the speed of the communication system.

Manually posted space inventory systems are giving way to electronic data storage devices—magnetic drums or magnetic discs on which the inventory of thousands of items can be kept, and queried and changed in a fraction of a second. Reservation agents located in the same city as the data storage device can, by depressing keys on a "key set," check space availability and reserve or cancel space almost before a customer can ask "Shall I hold the line?"

Handling "inter-line" business

One of tomorrow's challenges to the Bell System is double-barreled: the provision of communication channels of a type which will permit agents all over the country to query the central space control city, and switching systems which will permit them to query not only the space inventory of their own airline but also any connecting airline as well. When such a system is available, every seat will be reserved on a "request and confirm" basis. There will be no chance for "oversales," and no seat will go empty unnecessarily.

An airline seat is not always sold at the city where the passenger will board the flight. There is a certain minimum amount of information which must be sent to the boarding point: the passenger's name, his destination, the flight on which he is arriving if he is transferring from another airline or flight, and any special information which may be needed. Most airlines now prepare a special teletypewriter message to send this "boarding information". It requires little imagination to visualize the day when the device which tells the electronic inventory that a seat has been sold will also prepare the passenger's ticket and will prepare the boarding message in perforated paper

tape or magnetic tape form for later transmission to the boarding station. High speed written communication systems, with automatic switching, are needed for this job.

"Operations" is more than flying

EVEN BEFORE the passenger boards the airplane, the communications involved in "operations" have been helping to get the airplane ready to fly.

Briefly, "operations" includes the functions of getting a particular plane to a specific location at an appointed time *safely and economically.* Operations accounts for the remaining 30 per cent of the airline communications.

Over teletypewriter and facsimile services comes information concerning the weather along the route of the flight. Weather is a major consideration of the pilot in his choice of route and in fuel requirement computations.

The pilot's "flight plan" is approved, or "cleared," by the dispatcher, often through the use of intercity telephone or teletypwriter services. If the weather is such that the pilot has poor visibility, the flight must be under instrument flight

These air-line reservation agents may, by pressing a key on the instrument between them, activate an electronic device which will report on space availability, make reservation, cancel space, and provide other information

itten communi-ons systems with matic switching used efficiently by airline industry. is one of today's jor installations

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Weather information is all-important to the flight plans of every pilot, and wire communications are used to keep this information current and immediately available

rules, and a flight plan is filed with the Civil Aeronautics Administration's Air Route Traffic Controller.

Today, flight plans are usually telephoned to the Controller, who transcribes the information to "flight strips" which he uses in following and directing the flights under his control. Experiments are being conducted in the use of teletypewriter and facsimile for flight plan filing. Either will eliminate transcription by the Controller. Teletypewriter offers the added advantage of permitting transmission of the same information on the airline circuits to those who require it. This problem is one of increasing importance, since it appears probable that in the not too distant future the CAA will control all air carrier flights at all times—regardless of the weather. New developments in the field of high-speed written communication are needed.

While the pilot is planning his flight, the aircraft is being made ready. Few of the passengers waiting to board have any conception of the furious activity involved in getting the right airplane to the ramp, the proper amount of fuel in the tanks, the required number of meals in the galley, and the mail, baggage, and cargo so stowed as to give the aircraft proper "balance." Last minute changes in weather information may change the fuel requirement, which in turn may permit the boarding of "stand-bys," which in turn changes the number of meals required and the baggage to be handled! It all seems so simple when stated as "Flight twelve is now ready for departure at gate three; all aboard please."

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Telephone and teletypewriter intercommunicating systems are used today to coördinate this complex activity. Tomorrow's large aircraft will require new techniques. Closed-circuit video appears to offer the best prospect for a satisfactory solution. A single "status board" showing the progress of each activity to all concerned should cut precious minutes from the "ground time" of the aircraft.

Once in the cockpit, the pilot's contact with the rest of the world is by radio. As he taxis out toward the runway, he talks to the tower controller and gets his clearance for take-off. When he approaches his destination field, he talks to the tower there and is assigned a runway for landing and, after landing, a ramp at which to park the aircraft. Between take-off and landing the radio is seldom silent for long—especially if the weather is bad.

When a flight is in the air, there are two people on the ground who are vitally concerned with its progress: the CAA Air Route Traffic Controller and the airline dispatcher.

Some airlines have one central dispatching office, others have several regional offices. In either case the dispatcher plots the progress of the flight and, to do so, requires that the pilot report his position at stated intervals or locations. When a flight must be diverted because of weather or mechanical difficulty or when for any reason the flight plan cannot be followed, it is the dispatcher who calls the signals.

To the Air Route Traffic Controller, on a day when aircraft are "flying blind" and operating under instrument flight rules, the airliner is just one of many

Ground communications play an important role in keeping aircraft in flight readiness. This portable field telephone has an important role in the program

The all-important air-to-ground communications depend entirely on radio

commercial, military, and private planes which must be kept from bumping into each other. He knows, from the flight plans in front of him, where the aircraft are supposed to be; he is completely dependent upon position reports from the pilots for knowledge as to where they really are. He alone has the authority to permit an aircraft to change its course or altitude, and he directs such changes when in the interest of safety it appears wise to do so.

Most air carrier aircraft communicate with both dispatcher and controller by VHF radio, which has rather short range. The pilot talks to ground radio stations located along the routes he normally flies, and his reports are relayed by private line telephone or teletypewriter to the dispatcher and the controller. This system of communication relay is scarcely adequate for today's aircraft speeds – much less tomorrow's! The pilot of the jet-liner must talk directly with his company dispatcher and with the Air Route Traffic Controller.

Jets and electronics

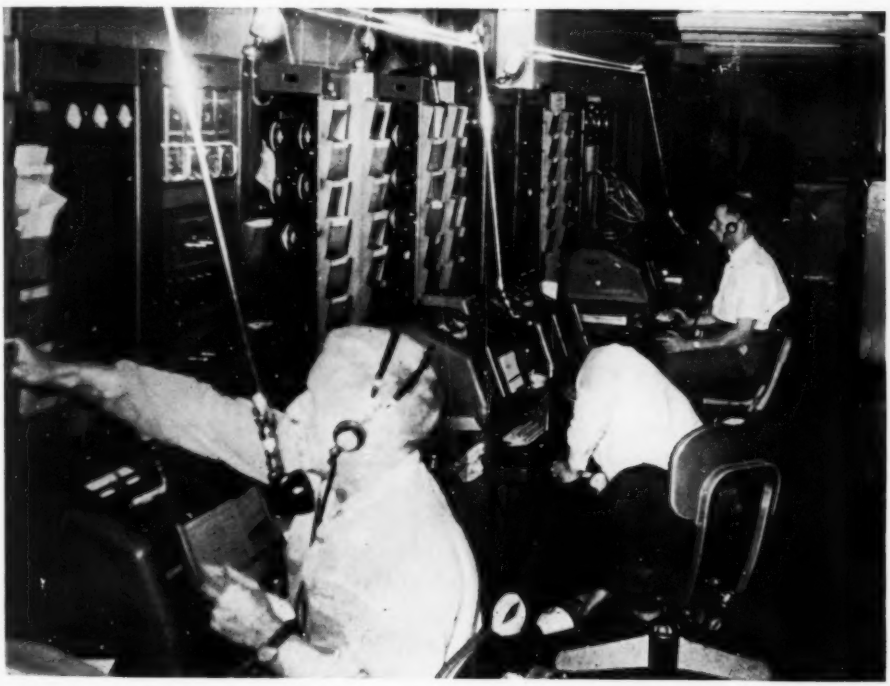
On one transcontinental air route there is today a system of ground radio stations directly connected to private line telephone circuits. This system, furnished by

the Bell System to Aeronautical Radio, Inc., the radio licensee for the airlines, permits direct conversation between pilot and dispatcher. It is probable that this type of operation will be expanded—but it will need to be supplemented by a new type of service because of several factors now entering the picture.

First, the CAA is in the process of establishing its own system of ground radio stations which will permit its controllers to talk directly to pilots—and not be dependent upon the airlines or Aeronautical Radio for the relay of communications. It is expected that within the next two years the airlines will be relieved of about 85 per cent of the relaying task. The number of air-ground contacts required by the airlines will be reduced appreciably, as the information required by the airline dispatcher is much less than that required by the CAA controller.

Second, the jet-liner operates most efficiently at altitudes considerably higher than those at which propeller-driven aircraft normally fly. At these altitudes are fast upper-air currents or "jet streams." The jet aircraft's course will usually follow these, rather than the route of shortest mileage. On transcontinental flights, the plane's course may lie near the Canadian border on one day, near the Mexican border on another.

The smaller volume of air-ground communication which will be handled by the airline radio stations and the wide area



Information from aircraft in flight received by radio operators on the ground is passed along to its destination by teletypewriter

The jet-liners are coming

over which the planes of any individual airline may fly, suggest that consideration be given to handling air-ground communication through Bell System exchange and long distance facilities. (An airline pilot cannot stop at a convenient coin telephone and call his dispatcher—as ground vehicles do!) Experiments have already started whereby the dispatcher calls an airline radio station within range of the aircraft by long distance and is connected directly through so he can talk to the pilot.

At the time the CAA establishes its own air-ground communication system, it will also establish radar surveillance over large portions of the nation's airways. This will enable the controller to "see" the location of aircraft, although he will still be dependent upon the pilot's oral reports, as he passes fixed "check points," for knowledge of the aircraft's altitude, course, and expected time of arrival at the next check point.

A little farther in the future, but probably starting within the next decade, we may expect the replacement of the radar-plus-oral reporting system by an electronic system which will get all the answers, store them, and present data to the controller on request. Perhaps this will be a radio data link which will periodically interrogate instruments and electronic devices in the aircraft, which will automatically tell the plane's identity, its position, speed, course, and altitude. These data will be fed to memory and computer equipment on the ground, from which the controller can conjure up a picture of the traffic in the airspace at any moment.

The duplicate reporting to both controller and dispatcher will be eliminated when a system such as this is in effect. In

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fact, the pilot need make no reports at all, as his electronic equipment will do it for him.

There appears to be no reason why the airline dispatcher cannot remotely request this memory and computing device to present a picture of his airline's plane positions. Intercity data channels capable of doing the job economically will be required to make this feasible.

Of equal importance with "what is needed" is "how much is needed". The survey group made studies of the correlation between various types of communication and airline operating statistics. Total communication of all types bears an almost direct relation to the number of passengers carried. In 1956 the airlines of this country carried 47 million passengers. Ten years earlier it was only 13 million; ten years in the future it is expected to be well over 100 million!

The Bell System's job in meeting this requirement is a big one!

THE Western Electric Company is purchasing property in downtown Manhattan as the site for a new building to consolidate office operations now conducted in rented quarters. Options were recently exercised for the purchase of properties located at 212-220 Broadway and an adjoining property at 147 Fulton Street. The consolidated plot will provide a ground area of about 33,000 square feet with a frontage of 157 feet on Broadway, 238 feet on Fulton Street and 221 feet on Ann Street. The property is diagonally across Broadway from A. T. & T. headquarters at 195.

Western Electric at present leases more than 400,000 square feet at more than a dozen locations in the downtown area, most of the space having been leased in recent years as part of the company's expansion program to meet the needs of the Bell System. The new building will permit consolidation of these offices in one building convenient to the company's headquarters, also at 195 Broadway, and make possible substantial operating economies.

"The Strange Case of the Cosmic Rays," the third major Bell System television production, coincides with world-wide IGY studies of cosmic radiation

"COSMIC RAYS" IS TIMELY TOPIC IN SCIENCE SERIES

RALPH BOWN

Chairman, SCIENTIFIC ADVISORY BOARD; FORMER VICE PRESIDENT — RESEARCH, BELL TELEPHONE LABORATORIES

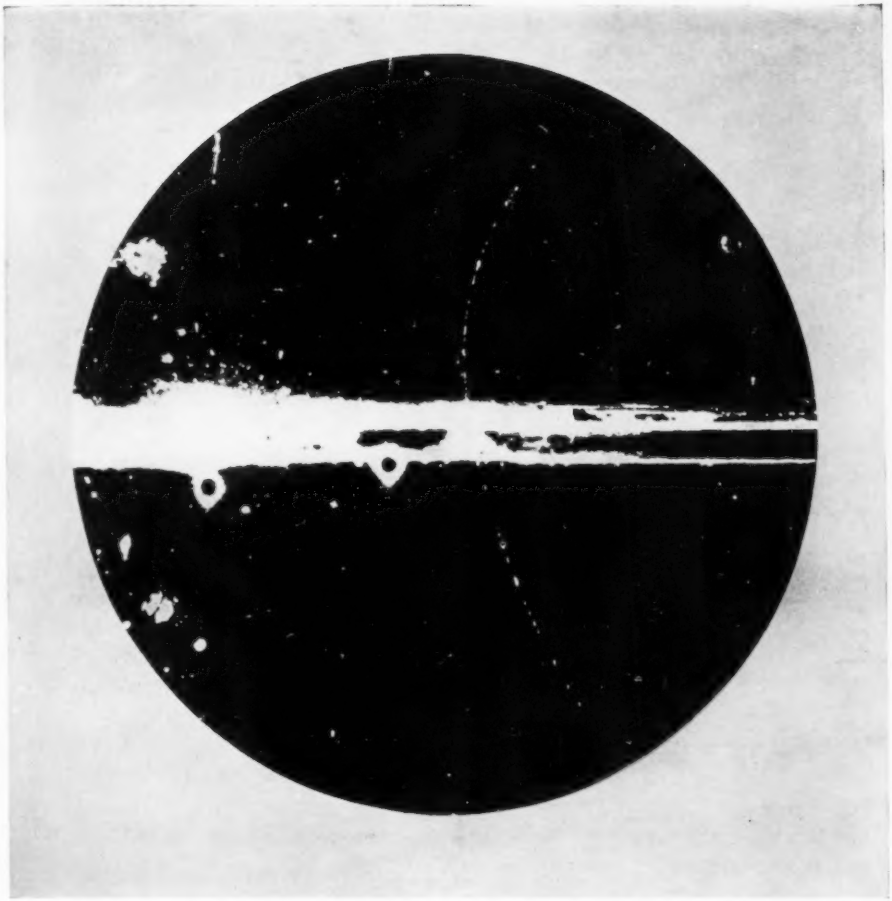
THIS AUTUMN, American scientists are studying cosmic radiation at dozens of stations throughout this country and at others from Greenland to Little America. Scientists of other countries are making observations of cosmic radiation at stations scattered over the earth from the North Cape of Norway to the southern tip of New Zealand. For cosmic rays is one of the ten major fields of study being undertaken by the world's scientists during the current International Geophysical Year, better known by its shorter name, IGY—which continues through December 31, 1958.

The third program of the Bell System Science Series, "The Strange Case of the Cosmic Rays," happens to be very timely during the IGY, since it shows scientists at work studying cosmic radiation. The program was telecast over the NBC-TV network on Friday, October 25, 1957.

This new program, more than either of its predecessors, is a presentation of the scientific method. It shows how scientists work, constantly and carefully, to unlock the secrets of natural phenomena and to extend the horizons of man's knowledge. It demonstrates the exchange of information and coöperation that is habitual with scientists, and is basic to the entire concept of the IGY. In so doing, "The Strange Case of the Cosmic Rays" should make a valuable contribution to greater popular appreciation of science and the work of scientists.

Unlike "Our Mr. Sun" and "Hemo the Magnificent," the two previous productions, this Science Series program deals with a subject relatively unfamiliar to the general public. You can't see or feel cosmic rays. A little more than 50 years ago we didn't even know of their existence. Today we know that cosmic rays are as much with us as sunlight or blood. They crash into and through us every minute. "The Strange Case of the Cosmic Rays" describes how scientists tracked down and identified this ever-present phenomenon of nature.

The story of the hunt for cosmic rays started with a simple device for detecting



This photograph of a positron's "track" (the thin line curving to the right) was taken by Dr. Carl Anderson, whose discovery of the positron won him the Nobel Prize for Physics in 1936. It is one of the most famous scientific photographs of all time and is featured in the third "Science Series" film

electric charge called the electroscope. About the turn of the century, scientists noticed that an electroscope slowly lost its electric charge even when no known form of radiation or other cause of leakage was present to explain it. No amount of shielding stopped this loss. So the conclusion was that some unknown form of radiation was at work.

The first step was to discover the origin of this radiation. Father Wulf took an electrometer, a calibrated form of electroscope, to the top of the Eiffel Tower—and found that the rate of loss was no less there than on the ground. Victor Francis Hess took one up with him in an Austrian Army balloon and found that the rate of loss at 17,000 feet was actually increased. Hess believed the source of radiation to be outside our atmosphere. But it remained for

an American scientist, Robert A. Millikan, to prove that the radiation causing the loss of the charge in the electroscope came from far outside the earth's atmosphere—from somewhere in the cosmos. Therefore, he named it "cosmic rays."

The next step was to find where cosmic radiation originated in outer space. Scientists learned that cosmic rays struck spots all around the earth with virtually the same intensity at all hours of the day and night. This ruled out their origin in the sun, a planet, or any single star. They came from everywhere in the Universe.

Radiation can take the form of waves, like light. Or it can take the form of particles, ultra-minute pieces of matter. The next step was to find out which. Both waves and particles produce clicks from a Geiger counter. But two German scientists rigged Geiger counters in tandem so that the waves could produce only relatively infrequent clicks. They found cosmic radiation produced a continuing staccato of clicks from the Geiger counters, thus proving that the rays were particles.

By this time, scientists had established two basic facts about cosmic rays – that they came from everywhere in outer space, and that they were particles. The next step was to find out what kind of particles.

This identification was complicated by a new discovery—that the cosmic rays hitting the ground did not actually start in outer space. Rather, they were "secondary" rays generated when the "primary" rays from outer space struck and shattered atoms in molecules of air after entering our atmosphere. Since there was no way to get to the top of our atmosphere at that time, scientists had to deduce the nature of the primary rays from what they could learn about the secondary rays striking the ground level.

What Are Cosmic Rays?

Cosmic rays are billions of invisible atomic meteors from outer space that plunge into our atmosphere with such terrific speed and force that they shatter atoms in air molecules and shower us with the fragments. This "cosmic fall-out" is responsible for about a quarter of the natural radiation constantly striking us. Study of cosmic rays has been basic to our knowledge of atomic energy. The effect of cosmic radiation on germ cells is thought to be a factor in the evolution of living creatures.

It was found that the cosmic ray particles left tracks in a cloud chamber, like the vapor trails of high flying planes. When the cloud chamber was placed in a magnetic field, the tracks curved. This indicated that the cosmic ray particles were charged and might be protons (with a positive electric charge) or electrons (with a negative charge). "The Strange Case of the Cosmic Rays" shows such a cloud chamber in action producing visible tracks of cosmic rays.

But were the primary cosmic rays also charged particles? The answer at that time had to come from measurement and deduction.

The earth itself is surrounded by a tremendous magnetic field, with the lines of force running from pole to pole. If the primary cosmic rays were charged particles, then those coming toward our atmosphere in a direction parallel to the lines of force would come straight through, while those coming at an angle would be deflected by the lines of force, and many

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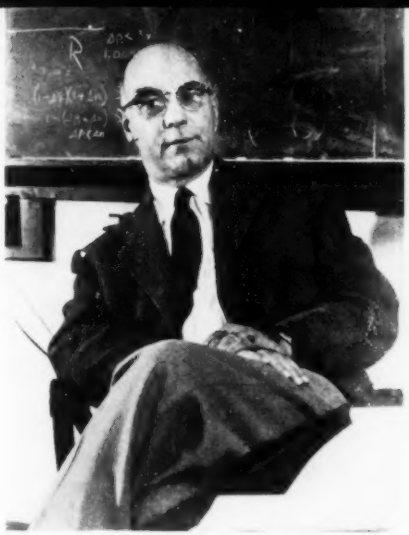
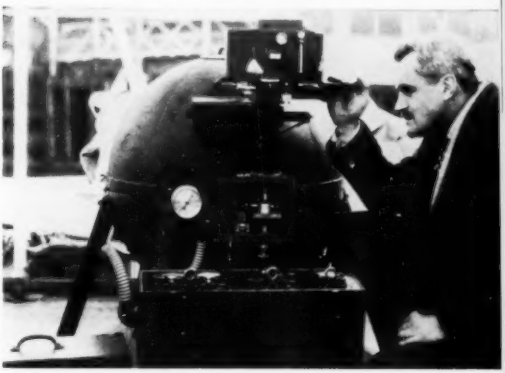


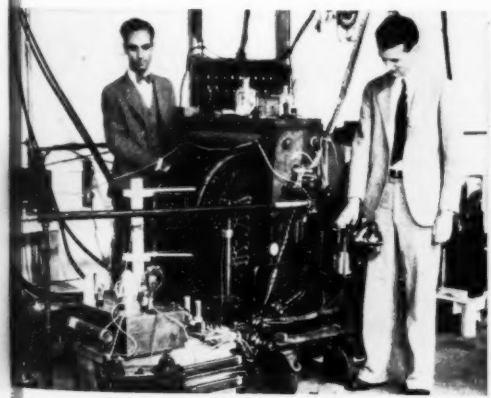
Dr. Carl Anderson, here in his office at the California Institute of Technology, is the principal scientific advisor on "Cosmic Rays"

Dr. Bruno Rossi, of the Massachusetts Institute of Technology, explains a diagram in "The Strange Case of the Cosmic Rays."

RESEARCHERS IN THE FIELD OF COSMIC RAYS



Nobel Prize winner Arthur Compton, one of many scientists who have contributed to cosmic ray research



This early photograph shows Nobel Prize winner Carl D. Anderson (left) and Seth Neddermeyer at work in cosmic ray research. The scene is featured in the film

Nobel Prize winner Robert A. Millikan (left) and Ira Bowen are among many scientists shown at their research.

Dr. Frank Baxter demonstrates to Richard Carlson (right) how Geiger counters rigged in tandem show that cosmic rays are made up of particles rather than waves

would miss the earth entirely. This would mean that the primary cosmic rays should produce more showers of secondaries to hit the earth near the North and South Poles than near the equator. Measuring the secondaries striking the earth at points all over the world, scientists found this to be true. Primary cosmic rays, like the secondaries, were particles with an electric charge.

Then scientists reasoned that if these particles had a positive electric charge, they would tend to enter our atmosphere more from a westerly direction. If they were negatively charged, they would tend to enter from an easterly direction. Again, measurement of the secondaries indicated that more of the primaries came from a westerly direction. Therefore, most of them were protons, which have a positive charge.

Balloon and rocket developments after World War II enabled scientists to send their instruments to the top of our atmosphere. This research indicated that most of the primary cosmic rays are naked atoms of hydrogen stripped of their electrons. Some are naked atoms of helium, and others are naked atoms of heavier elements, such as iron.

Half a century of work by scientists all over the world has gone into pinning down this basic information about cosmic rays. They apparently originate from everywhere in outer space. They are naked atoms of hydrogen, helium, and other elements. Some of them enter the earth's atmosphere, where they strike and shatter atoms in molecules of air. The particles that are the fragments of these molecules shower down upon the earth as secondary cosmic rays.

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This is scientific detective work that rivals the best detective fiction. Each step along the trail is shown in "The Strange Case of the Cosmic Rays" by animation, documentary film, and pictures of scientists at work.

The program also shows how cosmic ray research has contributed to our knowledge of atomic energy.

Until 1932, when the neutron, an uncharged particle, was discovered, scientists had thought that the building blocks of the universe were two charged particles—negative electrons and the heavier positive protons. In that same year, Carl D. Anderson photographed a cosmic ray particle which behaved like a light electron except that its track curved in the opposite direction. It had a positive instead of a negative charge. This proved to be another entirely new particle, which was called the positron.

In the past 25 years, cosmic ray investigation has uncovered more than 15 apparently different types of particles: the mu meson, the pi meson, and others. These discoveries have helped to solve some of the mysteries of the atom and have helped the development of our use of atomic energy.

"The Strange Case of the Cosmic Rays" points out that the cosmic ray detective story is far from complete. During the International Geophysical Year observations are being made all over the world, at the surface of the earth, throughout the earth's atmosphere, and as far as we can reach beyond the atmosphere. These are expected to refine and extend our knowledge of cosmic radiation.

Scientists still don't know exactly where the primary cosmic rays come from. One theory is that these stripped-down, souped-up atoms are thrown off by the surface explosions on stars like our sun. Then they are bounced back and forth, like badminton birds, between the magnetic fields of the galaxies in our cosmos, building up tremendous speed and energy. The earth

Richard Carlson and Dr. Frank Baxter (right), converse with puppet figures of famous mystery writers Dickens, Poe, and Dostoevski as they appear on the "magic screen"

gets into the paths of only a fraction of the cosmic rays flying through the limitless spaces of the Universe. Observations during the IGY may prove this theory, and they may establish other facts about cosmic radiation.

Cosmic rays have tremendous speed and energy. Even secondary cosmic rays travel fast enough to circle the earth in a single second. Every living thing on earth is constantly bombarded by natural radiation, about a quarter of the total being cosmic radiation. The rest comes from radioactivity in the substance of the earth. Scientists are still not ready to say what effects cosmic rays may have on life here on earth, and it may well be that science will prove one day that cosmic radiation affects evolution.

"The Strange Case of the Cosmic Rays" was produced with meticulous attention to the accuracy of scientific detail. Dr. Anderson, discoverer of the positron and winner of a Nobel Prize in physics, was principal advisor to producer Frank Capra during its preparation. Dr. Bruno Rossi, of Massachusetts Institute of Technology, and Dr. Marcel Schein, of the University of Chicago, were associate advisors on the production.

Nine winners of the Nobel Prize in physics are shown in the program. These are Robert A. Millikan (1923), Arthur Compton (1927), Carl Anderson (1936), V. F. Hess (1936), Enrico Fermi (1938), P. M. S. Blackett (1948), Hideki Yukawa (1949), C. F. Powell (1950), and Walter Bothe (1954). Dr. Yukawa saw part of the production of the program while he was visiting this country from Japan.

"The Strange Case of the Cosmic Rays" is producer Frank Capra's favorite among the four programs he has produced for the Science Series. He says that the search for the cosmic rays has all the elements of the classic "chase" that is basic to so many fine stories. He has capitalized on these elements in presenting the program as a detective story, with scientists cast as the detectives. The result is both entertainment and information. Although the primary emphasis is on the methods of science and research rather than on the intricacies of physics, it seems certain that after the telecast on October 25, more people will know about cosmic rays than ever did before.

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Work of the Accounting Departments encompasses every aspect of this business, looking to the future as it fulfills today's manifold responsibilities

THE CHALLENGE OF MODERN TELEPHONE ACCOUNTING

ALEXANDER L. STOTT

Comptroller, AMERICAN TELEPHONE AND TELEGRAPH COMPANY

TELEPHONE ACCOUNTING is probably a greater enigma to more telephone people than any other important part of the business. Some people may visualize it as the mere preparation of customers' bills. Others may think of it as routine record-keeping, with drudgery and monotony.

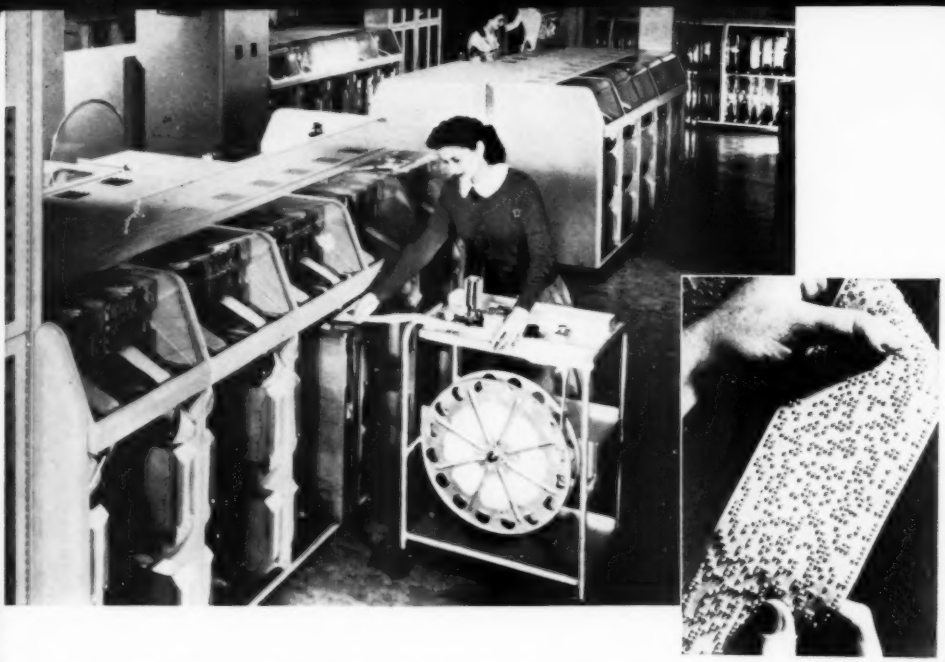
Nothing could be further from the truth.

Telephone accounting encompasses all phases of the business, from broad policy-making to minor detail. Myriads of business transactions are subject to review and reporting by Accounting before being reflected in profits—the lifeblood of our business.

What, then, is the real nature of the accounting job? Almost every one knows that Accounting maintains the books of the company and prepares and issues customers' bills. It also summarizes the billions of business transactions into the records of the business; it prepares employee payrolls and payments for bills; and it maintains a record of all items in telephone plant and of all of the expenses of running the business.

Beyond these duties, Accounting oversees the financial dealings of the company and vouches for the accuracy of the accounts through regular audits. It keeps the accounts of the business in accordance with the Uniform System of Accounts prescribed by the Federal Communications Commission. It also prepares many statistical reports and analyses on the operation of the business as required by Public Service Commissions in almost every state. Regulation of rates and services and the success of the companies' rate applications depend to an important extent on the accuracy of these accounts and reports.

But Accounting responsibility does not end here. All the information in the accounts must be analyzed and translated into the reports needed by management for the sound and efficient conduct of the



Automatic Message Accounting (AMA): — information automatically punched in tapes is processed to produce the long distance message charges to be billed our customers

business. Studies of the operations of the business are made by Accounting for the use of managers at all levels of the business in setting policy and in supervising operations. And finally, Accounting has recently taken on the responsibility for processing many kinds of large-volume clerical work for other departments.

Revenue Accounting

TELEPHONE accounting people must process literally billions of small business transtions each year. Thus, accounting work presents a tremendous challenge to produce methods which will reduce costs and yet maintain accuracy. The ability of the telephone business to cope with the inflation of recent years has been due in no small measure to the success of telephone people in doing a better and more economical job. As its share, Accounting has developed many improved techniques for processing large volumes of information.

The revenues of our business are derived in the main from about sixty billion telephone messages made by the people of this nation each year. Since the average message brings in only a few cents, Accounting and other departments must hold the costs of processing these messages to a minimum if telephone service is to be provided at reasonable rates. Accounting's largest operation is recording and pricing telephone service to customers, preparing their bills, and accounting for their payments. This work is done by about 33,000 accounting employees at 135 revenue accounting offices across the country, and involves the preparation of about 34 million bills each month.

One of the complex steps in preparing customers' bills is the pricing and billing of long distance messages. For years, accounting people have done this job by

using the tickets prepared by the long distance operators. They determine the charges for the calls by referring to rate schedules, and post the charges on each ticket. They then include the message charges in settlement summaries, sort the tickets by telephone number, and type the charges – including taxes – on the statements which accompany the customers' bills. They also verify these steps as necessary. In this process, seven distinct clerical operations are required for each call. It is a time-consuming procedure at best; nevertheless, it is the way that more than one and a half billion long distance messages must still be processed each year.

Many accounting offices are using punch card equipment to produce the summary section (front page) of the customer's bill

In recent years an increasingly large amount of billing of long distance messages has been done mechanically, particularly by Automatic Message Accounting (AMA) equipment. The AMA equipment automatically records the information needed for the billing of each long distance call – i.e., calling number, called number, time of starting and ending the message, etc. – by punching holes in a paper tape. The equipment assembles on another paper tape all the information on a particular call and prepares an individual punch card for it. By processing these cards with others containing rate information, the charge for the call is determined mechanically and punched in the card. In preparing the customer's bill, the equipment also sorts out the cards for each individual customer and prints a statement of his long distance charges.

In areas where extended area service is offered, the message unit charges for each customer are automatically obtained as a

Data processing centers in accounting departments are a recent innovation to handle large volume clerical operations for the various departments

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by-product of the AMA process. Today about one fourth of all station-to-station long distance messages are billed by AMA, or some 340,000,000 messages each year. By 1965 we expect that 80 percent of this traffic will be so handled.

Many of our Accounting offices are now preparing the customer's complete bill by use of punch card equipment. In addition to the information on long distance charges derived from the AMA process, they prepare a separate punch card for local service charges and additional cards for other charges for special equipment and the like. These cards are used to print the summary section of the customer's bill (the front page) which, together with the detailed statements of long distance charges, make up the entire bill. It is also possible, by punching separate cards as customer payments are made, to obtain by this process prompt information needed by Commercial and Accounting on customer payments, deposits, and balances due.

Disbursement Accounting

MAJOR IMPROVEMENTS have also been made in the methods of maintaining employee records, preparing payrolls, recording plant investment, accounting for operating expenses, and preparing financial reports. Work of this nature is performed by some 11,000 accounting employees in 63 disbursement accounting offices throughout the country.

Particularly significant advances have been made in the work of producing the 27,000,000 pay checks which telephone employees receive each year. Many detailed steps are required, for example, in preparing a pay check for a traffic employee. Her work report must be translated into pay hours, overtime hours, tour differentials, car-fare allowances, and similar items. Wage and tax computations must be made; allotments for savings, hospitalization, and the like, must be posted and deducted; and finally the pay check must

Punch card equipment performs a wide variety of operations. Here an accounting clerk is processing credit cards

be prepared. Until a decade ago, in most offices these operations were performed by hand in several steps by employees using key-driven machines. In recent years, however, great advances have been made in many accounting offices in preparing payrolls on mechanical punch card equipment. A few accounting offices are now using advanced electronic equipment to perform all of the steps in a continuous automatic process. About 77 per cent of employees' pay checks are now prepared by either mechanical or electronic punch card equipment, and by 1965 we expect that all payroll work will be done by these or even more advanced methods.

Data processing centers

PAPER WORK has become increasingly important and burdensome not only to the Accounting Department but to other departments as well. The number of record keepers is ever-increasing, and today almost one-fifth of Bell System people are engaged in some kind of clerical work.

Recently, data processing centers have been established for handling the volume clerical operations of the various departments of the companies. The concept of the data processing center is that large-volume clerical jobs now being done manually by various departments can be processed by mechanical means more efficiently and economically on a centralized basis. The assignment of this work to Accounting is a logical result of its experience in handling large volumes of paper work by machine processes.

An example of a job handled for the Plant Department by the data processing centers is the summarization and analysis of troubles reported by customers in using telephones. When a customer reports trouble on his line, a clerk in the repair service bureau records the information by marking a tabulating card with a spe-

Electronic data processing requires careful advance preparation and testing of programs for the machine. Here a newly developed program is being tested on a magnetic drum electronic data processing machine

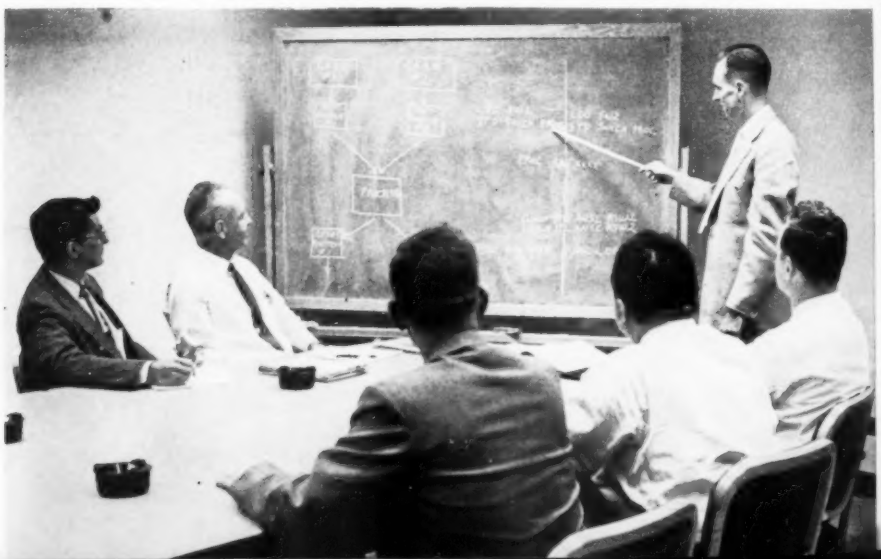
cial graphite pencil. (This recording is on a "mark-sense" card which can be converted automatically to a regular punch card.) The "mark-sense" card is forwarded to a Plant man who tests the customer's line and arranges for clearing the trouble. Plant people then mark additional information on the card to show the nature of the trouble, its location, and how it was handled. The "mark-sense" cards are periodically forwarded to a data processing center, where summary reports showing the nature and disposition of troubles are prepared by machine. These reports are used by management in supervising maintenance activities and in analyzing the causes of trouble.

Accounting simplification

FROM TIME TO TIME changes have been needed in the Uniform System of Accounts prescribed by the Federal Communications Commission to adapt it to new types of equipment being used in the business or to cope more efficiently with the skyrocketing volume of Accounting transactions. Commission people fully realize the importance of keeping our accounting system in tune with the times and have been most coöperative in making necessary changes.

A long step toward the modernization of the Uniform System of Accounts was taken in the recent revision of accounting for station equipment—i.e., telephone sets and associated wiring and equipment on customers' premises. Under the new accounting, a telephone remains in the Plant accounts from the time it is first purchased by the company until it is finally junked. The old accounting required telephones to be removed from the Plant accounts when taken out of service, and restored to the Plant accounts when reinstalled – a time consuming process in view of the heavy inward and outward movement of telephones. This change simplifies the daily work reports of thousands of Plant craftsmen and greatly reduces the accounting work of summarizing these reports. This revision also stabilizes the effect on expense of accounting for station wires by the application each month of appropriate depreciation rates to the wire investment where formerly the investment was charged to

Electronic machine programming requires special training of people to do that work



Clerks operating key punch machines convert accounting data into punch cards for machine processing

expense at the time the telephone was removed. The development of the new procedures was a joint effort by our Accounting, Plant, and Engineering people.

Responsibility for reports

ONE OF THE important responsibilities of Accounting people is the preparation of prompt, accurate, factual reports on operations, for use by all levels of management in running the business.

First, and perhaps most important, are the financial statements of the A. T. & T. Co. and its Associated Companies. These statements enable management to judge the progress of the business and the results of its various component parts. They are essential for financial planning and in determining the revenue needs of the business. They are also used by investors in appraising the value of the securities issued by the various Bell System companies, as well as by our share owners in determining the progress of their company.

In addition, Accounting makes statistical studies and reports which encompass far more than our own business operations. These reports deal with economics, finance, securities registrations, taxes, and pension matters, as well as technical accounting problems. Such studies and reports are important to our management in setting long-range policies for the business.

It goes without saying that complete objectivity is absolutely essential in preparing the reports and studies used by management in making important operating and policy decisions. We in Accounting view as of great importance our responsibility for preparing reports which are uninfluenced by the views of any particular group.

On-the-job training in machine operation is a major factor in the successful accomplishment of the accounting job

People make the job

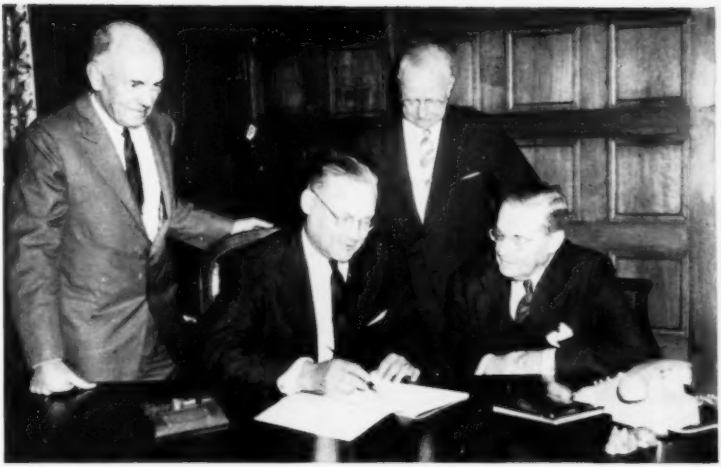
As IN other departments, people always have been and always will be the heart of the accounting job. Today, almost 50,000 accounting employees are working together to do the telephone accounting job.

Each Operating Company has a top-level accounting organization which is constantly working on methods and results, personnel administration, and technical accounting matters. In addition, the A. T. &. T. Co. has a staff working to provide advice and assistance to the Associated Companies on all phases of accounting administration, accounting operations, and professional accounting matters. These groups work together in keeping up with developments in this dynamic and rapidly changing field where new ideas spring not only from regulatory commissions and professional accounting bodies but also from accounting machine manufacturers and our own Bell Laboratories.

As we look to the future, we face still greater challenges in developing new ways to do a better and more efficient job. The volume of accounting work will continue to grow rapidly for many years. At the same time, great advances in the field of electronics will provide opportunities for even greater contributions by accounting people to the success of the business.

Electronic switching and electronic accounting will move forward together. The future will bring not only further improvements in the speed and quality of customer billing but greater efficiency in the whole accounting job. In addition, new equipments will permit Accounting to provide a wider range of information for the use of management.

Clearly, the telephone accounting job is a demanding one, and presents great challenges. To meet these challenges we must have able, imaginative, aggressive, forward-looking people. For this reason, we see the development and training of people to cope with the problems of the future as one of our most urgent tasks.



President Frederick R. Kappel of A. T. & T. signs one of the documents creating a second system of submarine telephone cables to Europe. William G. Thompson (right) signed as president of Eastern Telephone and Telegraph Company, a Canadian subsidiary of A. T. & T. Standing are A. T. & T. Vice Presidents George L. Best, left, and Henry T. Killingsworth, in charge of the Long Lines Department.

NORTH, SOUTH, EAST, AND WEST

Items concerning the extension of Bell System overseas telephone service

CONTRACTS were signed on September 30 for a new underseas twin telephone cable system between this continent and Europe. The great success of the first transatlantic telephone cable system, opened for service last autumn, prompted the building of a second European system.

Construction of the new link—which is similar to those already installed between the United States and Great Britain, with Alaska, and with Hawaii—is to start immediately. The completion date for the project, which will cost $40,000,000, is set for 1959.

The new cable will transmit 36 simultaneous conversations. Under the contract, 13 of these circuits will go to France, 13 to Germany, and the remaining circuits will be extended to other European countries.

Parties to the contract include the French Ministry of Posts, Telegraph and Telephones; the German Federal Ministry for Posts and Telecommunications; Eastern Telephone and Telegraph Company; and the A. T. & T. Co. The French and German organizations are responsible for telephone service within their respective countries. The Eastern Company, a Canadian subsidiary of the

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A. T. & T. Co., owns jointly with the Canadian Overseas Telecommunication Corporation and the British Post Office a radio relay system which will be used by the new link to Europe. It runs from the United States to Sidney Mines, Nova Scotia. Sixty-four percent of the cost will be borne by the A. T. & T. Co.; the remainder, equally, by the French and German Ministries.

On the North American continent the circuits will follow the route of the first transatlantic system—going by radio relay from the United States to Sydney Mines, Nova Scotia, thence by cable across Cabot Strait to Clarenville, Newfoundland. Here will be the land terminal of the cables to France. East of Newfoundland, their path will take them to Penmarch, a fishing village in Brittany. In all, the deep-sea portion will extend some 2,400 statute miles, about 200 miles longer than the first transatlantic telephone cable.

The A. T. & T. Co. will be responsible for constructing the system. The cables will be some 20 miles apart on the ocean floor, at depths up to three miles. One cable will carry voices eastward, the other westward. There will be 58 amplifiers in each cable, spaced about 44 statute miles apart.

The 5,000 miles of cable needed will be manufactured by four companies. These are Submarine Cables Ltd., Erith, England; Cables de Lyon, Calais, France; Felten and Guilleame, Carlswerk A.G., Nordenham, Germany; and Simplex Wire and Cable, Newington, N.H.

To Hawaii

A TWIN underseas telephone cable system, the longest and deepest in the world, was opened between Hawaii and the U. S. mainland on October 8. The new voiceway, which supplements radiotelephone service introduced in 1931, will provide about two and one-half times the number of circuits at present in use.

The new system, which cost $37,000,000 and contains 36 circuits, extends 2,400 statute miles between Point Arena, Calif., about 100 miles north of San Francisco, and Hanauma Bay on the island of Oahu, Hawaii, some twelve miles east of Honolulu. It will be used for telephone conversations, radio programs, private line telephone and teletypewriter messages, and be equipped for operator dialing.

The project is a joint undertaking of the A. T. & T. Co. and the Hawaiian Telephone Company, which furnishes telephone services in the islands. The latter organization has a 15 percent ownership in the link. In California the Pacific Telephone and Telegraph Company has established a 130 mile radio relay route between the cable terminal at Point Arena and Oakland, where conversations will feed into the Bell System network. From Hanauma Bay a land cable extends into Honolulu.

In general the system resembles the underseas telephone cables recently constructed between these shores and Great Britain and from the U. S. mainland to Alaska. One carries voices eastward, the other westward, and the cables lie about 25 miles apart on the ocean floor up to depths of three and one-half miles. There are 57 amplifiers built into each cable at intervals of about 44 statute miles.

Long Lines was responsible for constructing the deep-sea portion of the new voiceway. Three ships were involved in this operation: H.M.T.S. Monarch, C.S. Ocean Layer, and S.S. Arthur M. Huddell. The last-named served as a supply ship, as no cable ship is large enough to store

The 60-foot reflectors at Florida City transmit signals "over the horizon" across 180 miles of water.

all the cable needed. Small craft of various types were used in placing the shore ends. The total operation of sounding the route, transporting cable from manufacturing plants on both sides of the Atlantic, and laying it in the Pacific caused the vessels to travel a total of about 80,000 statute miles.

In recent years economic activity of many types has enlarged Hawaiian business that in pre-war days was chiefly based on sugar and pineapple. Light industry, growing tourist popularity and the defense program have all contributed to a broadening of the economy. As a consequence, Hawaii is the largest user of Bell System overseas telephone service. With the growing demand for service between the Islands and the Mainland, the decision was made to construct an underseas telephone cable. With military interests in view, the completion of this system was advanced by several years at the request of the U. S. Government.

To Cuba

THE FIRST "over-the-horizon" system for transmitting telephone conversations and television programs went into service between the United States and Cuba on September 12. A significant development in the communications art, the facilities will relieve crowded traffic facilities between points in the two countries.

The new system took two years to engineer and construct and cost $3,000,000. Known technically as "tropospheric scatter propagation," it differs sharply from conventional radio relay systems that use line-of-sight transmission for distances of approximately 30 miles. The system forces microwaves beyond the curvature of the earth. Although the antennas, which look like big movie screens, are out of sight of each other, they must be precisely aimed—within one degree, one 360th part

of a circle. Only one ten-trillionth of the signal sent out reaches the receiving antenna but, with tremendous amplification, that is enough.

Terminals for the system are 185 miles apart—at Florida City, Fla., and Guanabo, Cuba. Long Lines and the Radio Corporation of Cuba, a subsidiary of the International Telephone and Telegraph Corporation, built the new link which is now equipped to carry 36 simultaneous conversations plus one television program in each direction. For the first time the 18 TV stations in Cuba can be connected with the approximately 400 network stations in the United States, Canada and Mexico. The system can be expanded to handle 100 telephone circuits, plus one TV program in each direction.

Telephone traffic between the U. S. and Cuba, introduced in 1921, has tripled in the past ten years and is growing at a rapid rate. Underwater cables have been supplying 50 circuits for telephone service and these will now be supplemented by the "over-the-horizon" system. It is expected that more than a half a million messages will pass between residents of the two countries this year.

Elsewhere

OVERSEAS telephone service was made available between this country and Bulgaria on August 1. Calls are routed via Linz, Austria. A three-minute conversation costs $12. Overseas telephone service was also opened with Netherlands New Guinea on September 8. Calls are routed via Amsterdam, The Netherlands. A three-minute conversation costs $15. With these additions, Bell System overseas telephone service is now available to 121 countries and territories.

Ship-to-shore telephone service was made available to the S. S. Orcades, 28,000 ton liner of the Orient Steam Navigation Company, on September 15. With the addition of the Orcades, 45 passenger vessels now receive high seas service.

Bell Laboratories Experiments

IN ADDITION to their many applications in the Bell System, the newer plastics, casting resins, and rubber elastomers have great potential for use in submarine cable. But as yet no one can specify precisely how these materials will fare in the severe conditions encountered in marine environments. For this reason, a group in the Outside Plant Development Department at Bell Laboratories is conducting a series of intensive exposure and accelerated life tests. When completed, the tests will show degrees of resistance of these materials to the highly destructive action of marine animals and bacteria.

At two locations along the Atlantic coast where attack by marine life is especially severe, test samples are immersed and inspected at periodic intervals. Simultaneously, Laboratories biologists grow cultures of marine organisms in the laboratory and study their effects on organic materials. The test program is centered on two broad categories of marine life from which deterioration might be anticipated: bacteria, which can change local chemical and physical environments and thus influence rates of corrosion; and "borers"—mollusks or crustaceans that attack materials either for shelter or for food. Some of the latter are extremely powerful; in one test, for example, a type of mollusk known as the pholad was able to burrow well into a solid rod of lucite. So far, however, the new plastics and rubber elastomers have stood up very well —better, in fact, than natural fibers like jute.

Civic events — including telephone betterments — prompt celebrations which demonstrate good customer relations at the grass-roots level

FESTIVITY AND FRIENDSHIP IN THE GREAT OPEN SPACES

JOSEPH K. GILBERT

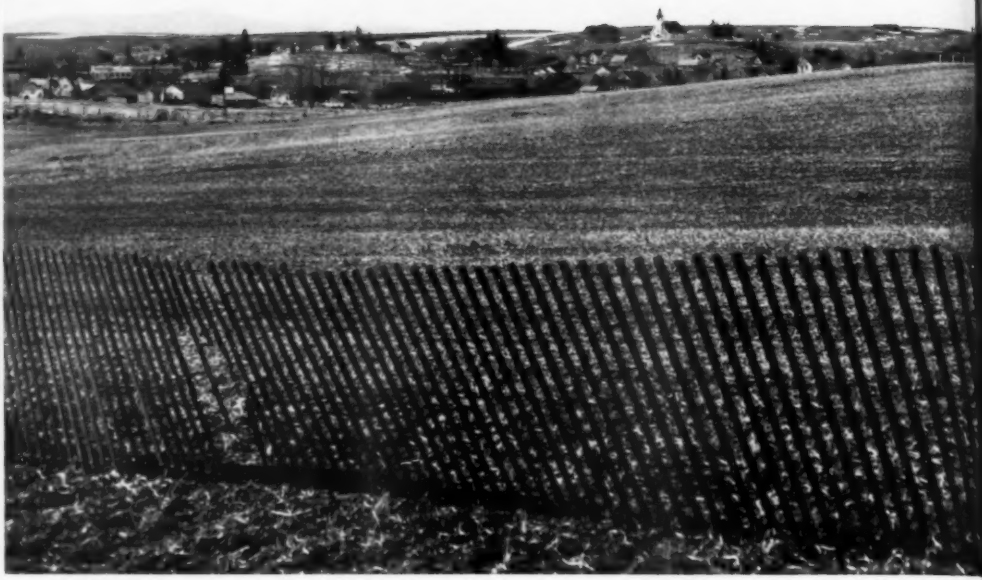
STAFF SUPERVISOR, PUBLIC RELATIONS, WASHINGTON-IDAHO AREA,
THE PACIFIC TELEPHONE AND TELEGRAPH COMPANY

PUBLIC RELATIONS, community living, customer relations—call it what you will, The Pacific Telephone and Telegraph Company's Washington-Idaho area has for several years carried out a consistent program to develop sound community relationships. Results of such a program are often intangible, difficult to measure. But several events which were an outgrowth of this program have provided a clue. Five localities in Idaho demonstrated their acceptance of Pacific Telephone as a community neighbor. The way they joined with the company to stage local telephone celebrations indicates that emphasis on this activity, as part of the every-day job, pays off. Several week ends highlighted by festivities, food, and friendship tell the story.

AIRMAN third class Robert Clovis had a self-imposed early reveille that Sunday morning at Lowry Air Force Base, near Denver. Time passed slowly while he waited. At last the phone rang, breaking the stillness. He hurried into the booth, and then "How are you?" filtered through the glass doors, into the big, deserted room.

The scene at the other end of the line, in Craigmont, Idaho, was in great contrast. There, his mother sat before a special telephone on a sidewalk table to place the call. It was 6:30 in the morning, cool, with the sun not very high in the sky. But crowded around in the street to watch were 200 of her fellow-townspeople and neighbors. At the first "Hello" they politely stilled their own voices, listened, and murmured with cordial interest. This was no ordinary conversation. This was the first long distance call to go through Craigmont's new dial switching office—and all 200 people had an intimate part in it.

Airman Clovis' home town is a place where neighborliness hasn't been crowded out by traffic signals, shopping centers, smoke stacks, and curious strangers. People there still join forces to work and to play.



Nezperce, perched on rolling country atop a plateau, is reached from Kamiah by a road which clings to canyon walls as it winds out of the valley

It's a community where an occasion of any significance finds people taking time to celebrate—to gather for an exchange of greetings, some "visiting," and a veritable feast.

The inroads of civilization have taken their toll of such utilitarian pioneer social activities as corn-husking bees and barn-roof raisings. But in the hospitable wide-open spaces of the west, vestiges of this kind of life still exist. Especially beyond the hills of Idaho where Pacific Telephone has cultivated its grass-roots relationships and seen them flower into intimate neighborliness.

People living in these communities are the kind whose way of life includes a natural sharing of joys and tribulations. Anything you get excited about is worth calling in the neighbors to share. Even though you're a utility corporation.

Here, in a portion of the West where closely-knit communities are spotted over a far-flung countryside ranging from undulating wheat fields to deeply etched canyons, people don't take anything for granted. Particularly something as important as the telephone. A major improvement program is the signal for festivities, and these folks celebrate with spontaneous enthusiasm.

Because of Pacific Telephone's sound customer relations program, a cut-over can develop into results not unlike the white-

washing of Tom Sawyer's fence. What might logically be only a company concern is taken over and becomes an expression of the community. Just as, down through the ages, important occasions have been celebrated by feasting, these people planned menus first, then built their celebrations around them. All staged with sleeves-rolled-up enthusiasm, they included cut-over breakfasts at Craigmont and Cottonwood, an outdoor barbecue at Grangeville, and pie and cake socials at Nezperce and Kamiah. On one occasion, members of the Lapwai Indian tribe gathered in the high school gymnasium to break bread with the telephone company and learn the story behind dial service. They demonstrated that an era of mechanization had not hurt the company's community standing.

Per capita activity during such celebrations in these small rural communities is a revelation to an outsider.

In one town the mayor spent an afternoon lugging groceries into the community center for a Sunday morning breakfast. In another, the president of the high school senior class—a well-grown young man—directed a pie and cake baking campaign to provide pastries for the entire population.

There appears to be nothing these townspeople won't do to make whatever event they undertake a big success. In the community of Cottonwood, two men operating the meat department of the grocery store owned by the mayor had developed an enviable reputation for their special hand-made sausage, prepared each year at Christmas and Easter. Their answer to continuing pleas that it be made available

Kamiah, nestled in a valley of the Clearwater River, was once a favorite wintering place for the Nezperce Indians, some of whom still live here

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at other times has always been a steadfast refusal, because of the tremendous work involved. Yet this pair, working three days, made 600 pounds of succulent links to serve at a sausage-and-hot-cake breakfast that celebrated conversion to dial service. Cottonwood's population is 673, yet more than 1200 people jammed the hall for breakfast.

When Craigmont held its celebration, the master of ceremonies was a radio announcer from Lewiston, 46 miles away. He had a special broadcast Saturday night that lasted until 2:30 in the morning. That completed, he spent the rest of the night driving the difficult highway up the mountainsides, arriving just as festivities began.

Seeds for this remarkable record of home-town loyalty were planted as early as 1952 at Grangeville. When the company replaced farmer lines and extended service to rural areas, it seemed like an occasion to celebrate. The resulting "Barbecue Day," with the Chamber of Commerce spearheading arrangements, was a whopping success. It drew more than 700 people.

One committee built a pit of concrete blocks in the city park and lined it with sheet metal. Farmers' wives began a widespread baking campaign which produced 125 pies and cakes for dessert. A committee of cooks from the Chamber began cooking top-grade beef at 4 A.M. in the ovens of a local bakery. At 11:00 they moved it to the barbecue pit for final preparation before serving. Washington Water Power Company not only provided huge coffee urns, but broke out a crew to run a power line to the isolated serving area so they could be plugged in and used.

As MIGHT BE expected, facilities for such undertakings are sometimes skimpy. Witness the temporary barbecue pit in Grangeville's park. But this lack of facilities is no deterrent to getting the job done. On this same occasion a company representative needed a platform for a lecture-demonstration—in this case "The Story of the Hilltops." A flat-bed truck driven into the park served as a satisfactory stage before an audience seated on the lawn. At Cottonwood, the community is blessed with a magnificent community center, ideal for seating and serving the vast throng of people. But its kitchen facilities were hardly designed for such a big cooking job. Extra stoves, again loaned by the power company, were set up and operated beside a gleaming fire truck in that portion of the building serving as a fire station.

Such gatherings enable company officials to tell their story about telephone service and expansion. Down-to-earth components

A modern Nezperce Indian woman, native to Kamiah, enjoys a dial telephone demonstration with her 10-year old son

Among the young, interest runs high in displays of telephone equipment which has an aura of the future about it

of project costs—cross arms, poles, wires and equipment—can be brought home to the people most concerned. And people there are, because such events sponsored jointly by the company and the community never fail to attract a big turnout.

Admittedly, there was once when a few company people had their doubts. A community breakfast was scheduled to begin at 6 A.M. At six o'clock the only persons present were cooks and telephone people—including visiting top management. The local representative, ever the optimist, submerged his own qualms by assuring a visiting division manager that people would be along shortly. "Shortly" turned out to be 6:30, but some 200 people arrived to eat hot cakes, sausages, eggs, and coffee provided by the Junior and Senior Chambers of Commerce and the J. C. wives. And they learned a lot about the company's operations.

THE COMPANY'S most recent opportunity to mingle with its neighbors took place when Kamiah and Nezperce were converted to dial service. The two communities are different in several ways. Kamiah is nestled in a valley of the Clearwater River, which flows out of the Bitterroot Mountains as it did to carry Lewis and Clark on their trip to the Northwest. Hemmed in by high plateaus, Kamiah enjoys a relatively mild winter climate and was a favorite wintering ground for the Nezperce Indians, some of whom are still residents. Farming and lumbering are important today.

Nezperce, a grain and beef farming center, is perched on rolling prairie country atop a plateau. From Kamiah it is reached by a road which clings to the canyon walls and winds out of the valley.

Although the scenes change, hospitality and interest in telephone company operations were demonstrated in each place. Folding chairs on Kamiah's high school gymnasium floor provided a view of the stage. There a company lecture-demonstrator explained the operation of a step-by-step switch, before a scenic back drop for a school play. A man whose sturdy pack horse had pulled lines through some of the rugged hills was there with his wife and daughter to learn more about this system he helped build. As guests watched the program, senior class girls cut and served the pies and cakes they brought. The formal program completed, more information was exchanged as company people and customers mixed conversation with their refreshments.

At Nezperce the high school gymnasium also served as the gathering place. While young and old were fascinated by the lecture-demonstrator and learned how their dial system operated, officers of the P.T.A. were downstairs dishing out refreshments. The P.T.A. assumed sponsorship of the observance—but, emphasized the president, non-members also contributed products of their ovens.

The local manager observed later the company's service would have to attain superb standards to be as good as the mince meat pie he sampled, flavored with elk meat from one of the nation's best elk-hunting regions nearby.

Amazing coöperation came from every quarter to make these events successful. In

Volunteer cooks from the Chamber of Commerce apparently enjoy their work as they cook sausages and hot cakes at Cottonwood's dial cutover breakfast

Cottonwood the manager met a snag when he sought additional white table cloths for several extra display tables. When all else failed, he tried the local hotel manager in hopes their linen might be borrowed. She first expressed her regret, but then relented and told him to come back later. During the interim she washed, dried, and ironed enough linen to fill his needs.

Such excellent support doesn't end after an event is over. At Grangeville, several days after the successful barbecue, the manager was confronted on the street by two members of the Chamber of Commerce. Casually they encouraged him to attend that day's meeting with them. He was completely non-plussed to find the program was a tribute to the telephone company for its service to the community and its active participation as a Chamber of Commerce member and Main Street neighbor.

"I couldn't hope to be eulogized any better at my own funeral," he commented later.

Reactions to the program were interesting. Before one such event a local youth, lately an air force flier stationed within training flight distance, returned to his community to demonstrate some routine aerial acrobatics against the clear blue sky. In a small rural town of Idaho this is quite an event. You couldn't say that people didn't look up to watch; but you could say in all honesty that the big topic of conversation in town that day was next day's telephone celebration.

A visiting telephone official had another impression after attending several gatherings. There was always a strong representation of children, ranging in age from pre-school toddlers to high school. Despite their numbers, he was particularly impressed because they were not noticeable.

Grown-ups have left a little girl all alone to make a big decision when it comes to dessert

Coming from a city neighborhood where vociferous kids in the block let you know they're around, he was visibly impressed with these quiet and orderly youngsters. To him it meant parents impressed upon their offspring that they were going to the telephone company's "house" and should conduct themselves accordingly.

How does Pacific Telephone achieve the kind of relationship with people in a community to foster such cordial good fellowship? By consistent, conscientious attention to the problem of public contact.

No small part of this attention is continuing consideration of the community needs and interests. A great many rural families in these areas had been served by farmer lines. Countless open meetings between company representatives and these subscribers to view the problems of modernization from both sides generated a favorable climate.

It is a top-priority activity to get acquainted with and work with local editors: to keep them informed of our operations and situations. Their continued support and understanding have been extremely helpful.

The company's localized advertising program, in which the manager has an opportunity to discuss local telephone projects and problems in a regularly scheduled ad bearing his picture and signature, has helped bring about support and understanding.

Like Bell System Companies everywhere, the company takes part in local civic programs and organizations as much as possible. Employees have worked on projects and the company has not hesitated to help erect a baseball backstop or Christmas tree lights when such a project needed doing.

If you are driving in Idaho and see somebody walking along the road, you stop and give him a lift. A telephone engineer, driving his car through the Nezperce area one day, stopped to offer a ride to an elderly man trudging towards town. As they rode along, he asked his passenger how he liked his new dial telephone service. A smile broke across his wrinkled brown face as he answered, "Well sir, it sure talks plumb plain."

Talking "plumb plain" to subscribers is one reason for the company's excellent standing. They are down-to-earth people who understand and appreciate a person-to-person relationship, and would resent any sugar-coated talk.

Benefits of this way of corporate life might well be illustrated by an incident which happened at one of the gatherings. A somewhat hesitant, serious high-school youth made his way toward a district commercial manager, seeking information about the Bell Laboratories. Interested in science and mathematics, he hopes to work there some day and wanted to channel his education accordingly.

A telephone man could unselfishly say it's a unique feeling to watch so many outsiders working so hard to feed and entertain his guests. And it's probably the best testimony in the world to the value of a sound customer relations program.

It seemed fitting that the man who had complete charge of the cooking detail at Grangeville should be paid for his efforts. A short time later, the same man encountered on the street the man who had paid him, and declared the payment should have been the other way around. Business at his department store had improved so much after the barbecue, he felt guilty about having been paid.

The ultimate in community loyalty was

perhaps shown by the president of Craigmont's Junior Chamber of Commerce at the time of the celebration. Not only did he serve as "chief cook and bottle washer," to quote his contemporaries, but closed his place of business in order to do it. He even placed a sign in the door urging people to attend the breakfast. The business he closed was his own restaurant!

A Bell System photographer who covered some of the events recalls an incident worth noting, too. As he obtained pictures of Cottonwood's sausage making activity, he was eyed suspiciously all the while by the town marshal. Not because he was working behind the counter, but because here was an outsider from the big city finding an event, that was only natural to Cottonwood residents, unusual enough to be photographed.

At another event the photographer approached an Indian woman, with some misgivings, to see if she would pose with a modern colored telephone. His hesitancy was uncalled for. The broad grin displayed by this modern-day member of the once famed and feared Nezperce tribe indicated the picture taking was the high point of her evening. A copy probably claims a prominent spot in her home.

If more proof were needed of the resulting fine relationship between customer and company, an episode in Nezperce should be the clincher. After the formal program, customers were invited to ask questions about the new dial service. Many came for-

ward, some to inquire about problems they had encountered since the cut-over a few days earlier. Most were cases the company had not known about. One in particular concerned an elderly resident who lived alone in the country and for several days had been without service.

The manager said the case would be investigated immediately and suggested that if the company had been informed previously, the repairs could have been effected at once.

"Well, we knew how busy your people were because of this change-over, so we didn't think we ought to bother you," was the customer's heartwarming reply.

No finer testimony to the drawing power of these community-company programs could be cited than to relate an event which took place in Cottonwood. A prominent clergyman had been invited to the breakfast, and offered the blessing. At a later service, he discussed some of the coming events on the church calendar, and concluded by saying: "The church is having its annual bazaar soon. I only hope it's as well attended as the telephone breakfast I just left."

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Who's Who & What's What

(Continued from page 3)

entific Advisory Board of the Bell System Science Series. To this MAGAZINE for Spring 1954 he contributed "What Is Science Doing to Electronics?"; and his "A Scientist Looks at the Future of This Business" appeared in the issue for Spring 1956.

HAVING BEEN successively treasurer and comptroller of the American Telephone and Telegraph Company is the distinction enjoyed by ALEXANDER L. STOTT, who contributes "The Challenge of Modern Telephone Accounting" to this issue. Starting in the Chief Statistician's Division of the Comptroller's Department in 1929, he transferred to the Long Lines Department a decade later, where he remained until 1942. By that time this country was at war, and he took three years out to serve in the Navy, where he attained the rank of commander. He rejoined A. T. & T. in 1945, in the Treasury Department, and moved over to the Comptroller's in 1949. There he stayed until 1952—when he became treasurer. A year later he assumed his present office of comptroller. To this MAGAZINE of just a year ago he contributed the sprightly "People and Telephones—More and More of Both."

BEFORE joining the Pacific Telephone and Telegraph Company's Public Relations Department nearly three years ago as a staff writer, JOSEPH K. GILBERT spent seven years in the weekly newspaper field in the Pacific Northwest, where he held posts ranging from reporter to editor to advertising manager. With Pacific Telephone, his writing assignments have included newspaper and magazine features, television news films, customer relations feature films, and a special employee manual on company financing and rate making.

Several of the events described in his contribution to this issue he covered first hand.

Joseph K. Gilbert

HEADQUARTERS SUMMARY

June 15 to Sept. 15, 1957.

STUDIES conducted over the past few years have shown that breakage of black transmitter and receiver caps results in System maintenance expense of about $1,500,000 annually, as well as inconvenience to customers.

Investigation of various plastics that might be employed to substantially reduce this source of maintenance effort and expense has shown that the use of thermoplastic material is extremely effective in combating cap breakage. Western Electric, therefore, is changing over to the use of thermoplastic in the production of transmitter and receiver caps for use with black handsets within a relatively short time.

Other colors of transmitter and receiver caps have been of thermoplastic materials since the introduction of colors in the 500 series of telephone sets.

TO DETERMINE customer reaction to the present arrangement in which a bell is provided for each telephone set in the home, as contrasted to the idea of a single centrally-located bell, about 150 trial models of a "centralized" ringer are being tested in Atlanta, Georgia.

The centralized ringer has the general appearance of a small door chime. It is intended for wall mounting at a central location in the home, slightly above door height. By means of a pull chain, the customer may select either a loud bell sound or a much softer "ding-dong" chime signal. A tell-tale indicates to the customer the condition selected. The loud bell is of sufficient intensity to be heard outside—on the terrace or in the patio. The ding-dong signal, of lower intensity, is intended for use when the customer is in the house.

If this approach proves acceptable, telephone sets of the future can be made smaller because of the space saved by the elimination of the present ringer. Where some ringing signal is needed in addition to the centralized ringer, it would be feasible to use a small auxiliary ringer, about the size of a king-size cigarette pack, which has been developed as a possible replacement for the large ringer arrangement now being used.

MARKET TRIALS of the proposed bedroom telephone set are now under way at Norristown, Pennsylvania, and Peoria, Illinois. The bedroom set is small and compact. Its oval mounting is about 8" long. Over-all height of the mounting and "cradled" handset is slightly under four inches. The set includes an electronic tone ringer with volume control, and a dial light with night-light feature. The sets are in aqua-blue, rose-pink, white and light-beige colors.

ON JULY 15 Bell of Pennsylvania began trial operation in Allentown-Bethlehem of a personal signaling service to radio receivers worn or carried on the person. The radio receiver is 3¾" x 2⅝" x 1" (at thickest point) and weighs less than half a pound.

Each receiver is tuned to receive its own signal. Two transmitters, one in Allentown and one in Bethlehem, are used. The range of reception is from about five miles outdoors down to one or two miles indoors and in cars.

Customers wishing to signal one of the receivers give its 4-digit number to a special signaling operator who "dials" the number on an "encoder" for transmission over the air. The signal is sent out alternately from each of the two transmitters and goes out three times from each. Receipt of the signal causes a tone to sound in the appropriate receiver until turned off by the possessor of the set, who then takes a pre-arranged action—generally, a telephone call to his office.

THE Customer Products Planning Division has scheduled a test of a new farm communications system during the first quarter of 1958. The new system will provide for the following facilities:

One central office line; voice communication between farmhouse and outbuildings; a hold feature on the central office line while using the local communication facilities; voice paging; hands-free use by called parties on local communication calls; code signaling; and a means of ringing more bells than can now be rung on multi-party lines by conventional methods.

Surveys have indicated that a system of this type is desired by rural customers if priced attractively. Initially about 150 systems will be offered. The test should indicate the potential market, the features most desired, and the modifications which may be necessary before a general offering is made.

A PLAN to split the Boston alphabetical directory into four separate books and the Yellow Pages into eight books, eliminating seven small locality directories, will be initiated

January 1958. This action was decided upon after a comprehensive study of the usage, calling habits, and buying areas of telephone customers in the Boston metropolitan area.

THROUGH SEPTEMBER, Bell System companies sold ten bond or debenture issues totaling $680 million, including an A. T. & T. issue of $250 million. For the last quarter of the year, issues already sold or scheduled will total $420 million, including another $250 million A. T. & T. issue. The total for the year will therefore come to $1.1 billion—a staggering amount to have to sell in a twelve-month period.

Not only have interest rates risen to the highest levels in the past quarter century, but, as might be anticipated under such conditions, the spread between the interest cost for new issues and the market yields for seasoned issues has widened. As a result, new Bell System issues have been selling at progressively higher interest costs, ranging from 4.21% to 4.65% in the first quarter of the current year, from 4.36% to 4.91% in the second quarter, and from 4.47% to 5.00% in the third quarter.

AS PART of continuing studies at Bell Laboratories to determine ways and means of increasing the speed of transmitting information over communication channels, a new system using a two-speed tape recorder is being tested experimentally. The recorder receives data at slow speed and "plays" it over the channel at high speed. Since the modulated carrier frequency is recorded on the magnetic tape, the arrangement has been termed the "recorded carrier" system. It makes use of the 43A1 FM carrier telegraph terminal.

The tape is speeded up eight times in the process. This means that information accepted at 100 words per minute is transmitted at 800 words per minute, or, in terms of "bits" of information, the increase is from 75 per second to 600. A 950-foot reel of tape records an hour and 36 minutes of slow-speed data and, at the receiving end, records 12 minutes of high-speed data. The recorded carrier system was designed for channels that can be used for either voice or data, wherein lies one of the great potential advantages of such systems. Channels normally idle during certain hours could be used at these times for transmitting large amounts of data, with the result that the total amount of information transmitted per channel per day would be greatly increased.

BELL LABORATORIES has reached into Irish mythology to name a new transistorized electronic machine "Leprechaun." It is a high-speed digital computer developed under an Air Force contract, and is to be used in computer research for military applications. Leprechaun illustrates the drastic reductions in size and power-consumption made possible by the transistor. The computer is not much larger than a console television set and it uses less power—despite the fact that it has some 5000 transistors and about 4000 other electronic components. Hence the name "Leprechaun," meaning "little body."

Fortune magazine, conducting a study of the 500 largest industrial corporations in the nation, found Western Electric to be the ninth largest manufacturing company in total sales during 1956, with $2,372,726,000. The survey reported Western eighth in number of employees. Total profits in dollars placed the company 25th highest among the 500 corporations.

However, from the significant standpoint of the rate of profit when measured in terms of the amount of profit per dollar of sales, Western Electric stood 372nd among the 500. West ern's relatively low rate of profit reflects the company's policy of supplying equipment to Bell telephone companies at the lowest possible price consistent with sound management of the business. When Western's profit was compared from the point of view of return on invested capital, the company ranked 257th.

WESTERN ELECTRIC has announced plans to build a $20,000,000 manufacturing plant near Kansas City, Missouri, for the production of telephone sets and various types of semi-conductors and other electronic components. Western has acquired options to purchase 250 acres of land for the 1,300,000-square-foot factory. If rezoning and other problems are satisfactorily resolved, ground will be broken early in 1958, with initial occupancy scheduled for late 1960 or early '61. Employment is expected to reach about 4,000 when full production is reached. This is the third new plant for which Western Electric has announced plans this year. The other two are Oklahoma City, where construction of a pilot plant is well under way, and Columbus, Ohio, where construction of the permanent plant has begun.

The Blue Pencil

THE PEOPLE shown in our cover painting are contemporary, all right, but not the plane and the communications equipment. Those, as Donald E. Smolen has depicted them, lie in the future. Perhaps the not too distant future, at that—as Robert E. Conrath makes pretty plausible in his stimulating article "What Communications Will Jet Planes Need?"

Have you happened to notice the covers on recent issues of this Magazine? Lively, pictorially interesting, well executed, but all of them quite different—that's how we try to have them. Various techniques contribute to their diversity, and that of course calls for different artists—of whom there is no lack in and about New York. Mr. Smolen is a young commercial artist who was selected to create our cover because we thought his particular technique would produce the desired effect. We hope you like it.

Autumn Cover

AS A practical matter, no editor of a publication such as this expects for a minute that all his readers will find interest in all the articles in any given issue. If he succeeds in providing such varied fare that each reader will, on the average, find one or two topics—or perhaps more now and then—which touch on his or her particular interests, he can feel he isn't doing too badly.

We mention this accepted fact because in this issue appears an article of such broad significance that we feel it is important to all our readers. We hope that all will read Mr. Kappel's talk before the Independent Telephone Association last October, and ponder the problems which he sees facing the industry of which we are a part. Whatever other article may or may not interest this or that reader, here is something that should appeal to all. We are happy to be privileged to put it forth in print.

THERE ARE, of course, other items of fare which combine to produce—within the field of communications—a considerable variety of topic and, in this instance, of origin. Among them are contributions which emanate from localities variously remote from 195 Broadway —which is the more usual source of material in these pages.

From the Pacific North-West comes Joe Gilbert's instance of public relations which brings with it the crisp feel of the hills and valleys of Idaho. More objective and in a different vein is Bob Conrath's contribution, from mid-Western Kansas City, discussing the strides in aviation communications into both the near and the distant future. And while Ralph Bown's *locus* is generally no farther than suburban New Jersey, he is now retired from Bell Laboratories and therefore distant in another sense.

SINCE MR. BOWN is chairman of the Scientific Advisory Board of the Bell System's Science Series, it is perhaps appropriate to recount here an unusual incident which occurred in connection with *Hemo the Magnificent*, second of the TV series which Frank Capra is producing.

One day not long ago a big crate was delivered to Capra's offices in Hollywood. Digging into the excelsior, Miss Maggie Parker, secretary to Mr. Capra, uncovered a trophy

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almost three feet tall, topped by a winged figure holding a torch.

It carried an inscription: "To Frank Capra For Writing & Directing 'Hemo The Magnificent' A Very Fine Program (signed) Smiley."

There was no identification of "Smiley" nor any explanation of the background of the trophy.

A few days later Mr. Capra received a letter from Cincinnati that read, in part:

"I don't make a lot of money and I certainly have no claim to being a critic. But, I do have a good job and I know the value of the fine feelings which your program stirred up in me.

"Please accept this trophy in appreciation of the best program which I have seen on television. It was a program which bettered, in some way, every person who saw it." It was signed Sam O. Smiley.

Said Mr. Capra, "I've received a number of awards during my career, but I'll always remember the 'Smiley Award' because I feel it's the only one I've ever had that came directly from the public. It's really a very great honor."

Mr. Smiley is a 28-year-old employee of the General Electric Company in Cincinnati. The "Smiley Award" was strictly his own idea.

THE MYTH of the soulless corporation is pretty much a thing of the past, but we derive special pleasure from encountering instances where some Bell System organization has gone out of its way to do something that shows recognition of a special opportunity, a sensibility "beyond the call of duty"—"heart," in other words.

You may remember that a few years ago the Southern New England Telephone Company, about to provide an outdoor telephone booth at the Mystic Museum—which is devoted to matters maritime and nautical—secured the pilot house from an outworn vessel and set it up on the grounds, complete with wheel and binnacle. New England may be especially prolific of such relics, for the same company has now preserved from destruction in Norwich, Conn., a house which was the home of two Connecticut governors: Roger Sherman Baldwin and Simeon Eben Baldwin. The telephone company had purchased a five-acre tract on which to erect a building with space for its eastern division offices, and on it were three time-ravaged houses. Investigation revealed on one a weather-beaten sign "John Baldwin, 1659," and subsequent inquiry indicated that the cellar was dug in the 17th century and the present house, still structurally sound, built in the 1750s. So the building was restored, old fireplaces opened up, and the Colonial atmosphere preserved in every way possible. The "before" and "after" pictures at the top of this page show how successfully the telephone company stretched a point to please Norwich citizens—and antiquarians generally.

SINCE "The DEW Line: Sentinel of the Northland" was published in our issue for Summer 1956, Western Electric has completed this gigantic undertaking—on July 31 last—of the Distant Early Warning Line of radar stations in the Arctic and has turned the installation over to the Air Force. It is impossible to describe in space available here the scope and significance of this project of National Defense, but it will long be recalled as a feat that challenged the muscles and the courage and the souls of men. A lake in northern Canada has now been named in honor of the

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first project manager of DEW Line: Vernon B. Bagnall.

Mr. Bagnall directed the planning, engineering and construction of the DEW Line from the time of its inception in 1952 until his return to the Long Lines department in January, 1956. He died a year ago.

Mr. Bagnall was honored posthumously by the Air Force last year for the "ingenuity, practical engineering ability, outstanding leadership and determination" which he contributed to the DEW Line project.

Bagnall Lake is on the Melville Peninsula, lying between the Gulf of Boothia and Foxe Basin, north of Hudson Bay.

In a more recent issue—Spring 1957—Heather Peto's "Better Business Writing" attracted quite a bit of interested attention. One reader-correspondent ended his pleasant letter with a plea for just that—"better writing"—and the elimination of "instrumentalities." Since we use that six-cylinder—oops, syllable—word only when pushed to the last extreme, we replied that we are in agreement and will offer a prize for a universally applicable synonym. The prize is an Oliver typewriter, and anyone who recalls those cast-iron word smashers will sense that it is proffered in jest. We'll be glad of suggestions, nonetheless. Have you a workable alternative?

JSB

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